

PREPARATORY STAGES OF HOMOPTERA UNILINEATA.

BY HOWARD L. CLARK, Bristol, R. I.

Eggs.—Obtained from two females taken at sugar and deposited May 25 to 29, 1916. Dia. 1 mm.; shape blunt cone rounded at the apex; irregular vertical ribs as in many of the *Catocalas*; color bright green, soon changing to dark purple. Some green fluid discharged with the eggs. Hatched June 4 to June 6, making this period nine days.

Young larvæ.—Length 6 mm.; body very slender and thread-like; two anterior pairs of prolegs undeveloped; walk with a looping movement and with great rapidity; very active and refractory. Head prominent, yellowish brown; body greenish gray and almost transparent before the food plant was found. They refused wild cherry, apple, maple, oak, birch, tulip, rose, violet, privet, lilac, and hickory; at last they were offered ordinary locust, *Robinia pseudacacia*. This they seized upon eagerly and devoured voraciously, the green showing clearly through the transparent skin.

At this period all were confined in a large battery jar with a cheese cloth cover. From this many would suspend themselves when not eating. Later about half of them were transferred to an ordinary breeding cage with dirt on the bottom. It became impossible to detect any regular succession of moults, as the larvæ developed at very different rates and gave little evidence, either in their habits or exuviae, of when these changes occurred.

June 11. No moult detected yet but the larvæ had increased a great deal in size. Length 8 mm. Body still slender and tapering, especially posteriorly, shining and transparent. Head yellow with groups of black spots at the sides of the jaws. Small black tubercles, each emitting a single black hair, scattered over the body. The head also bristles with black hairs. A broad creamy colored lateral stripe and other narrower ones indicated. Thoracic segments pinkish, middle of the body bright green, presumably the food showing through. Posterior extremity light, fleshy and transparent. Two anterior pairs of prolegs

entirely absent. Distance from the thoracic legs to the third and fourth pairs of prolegs long.

June 14. Another moult must have been passed, although there were no head cases nor old skins to be found. Length 12 mm. Head pinkish cream color, heavily gridironed with a network of dark brown lines. Rudiments of the two anterior pairs of prolegs appeared. Thoracic segments pinkish brown, rest of the body dull green, shading again to pinkish brown posteriorly. Longitudinal lines and piliferous warts about the same as before.

June 18. No evidence of a moult except that the larvæ had changed conspicuously in size and structure. Length 25 mm., but still very slender and in general appearance much like a *Catocala* larva. Two anterior pairs of prolegs about half developed; all four pairs light flesh color dotted with black. A distinct dorsal hump on the 11th segment and also an enlargement on the 4th segment. Prevailing color dark green, skin somewhat wrinkled, dark olive below, longitudinal light stripes persist, purplish tinge anteriorly. Spiracles inconspicuous, black edged with white.

June 20. At last a moult was distinctly in evidence with the larvæ varying greatly in size; largest length 35 mm. Head with color and pattern the same. First segment conspicuously swollen and globular in shape. Two anterior pairs of prolegs nearly developed and in use when in rest, but the larvæ still employ the looping method of locomotion. Dark wart-like excrescences on the 4th segment and the conical hump on the 11th quite conspicuous. Prevailing color purple brown washed liberally on the back with splashes of light straw color. Stripes persist and the whole body is finely mottled with white. Below greenish white with a dark brown spot on each segment. Base of black piliferous warts is white. Under a 25 mm. glass the larva with its wrinkled skin looks quite like a small snake. Stigmata still inconspicuous.

June 25. Another moult in process, after which length 60 mm.; body slender and tapering toward each extremity. Greatest diameter 5 mm. Color and marking of the rather small head the same as before. Swelling of the 1st segment subsided. All three pairs of posterior prolegs developed, the anterior pair only abortive. Excrescence on the 4th segment now represented by a

dark patch, hump on the 11th shaped like the tooth of a saw, slanting forward, almost perpendicular behind, velvet black, cleft at the top. Beyond the 9th segment the body appears flat and pointed and the anal prolegs extend back almost horizontally when at rest spread like a <. To the naked eye the prevailing color, olive mottled and striped in many shades. Above the line of the stigmata the ornamentation is divided into seven broad longitudinal stripes, the stripe down the middle of the back in light shade, then on each side one darker, one lighter and the lowest almost black. Between each stripe a fine light line, almost white in places. These markings all clearer and more pronounced on the thoracic segments. Color below light with a black ventral stripe broken into a spot on each segment. Under a 25 mm. glass, piliferous spots almost entirely white, still with a single black hair each. Stigmata dark and inconspicuous with no light ring. The whole body appears mottled or marbled in purplish brown and yellow and yellowish green, the dark longitudinal stripes appearing where the dark colors prevail and the light stripes vice versa. The skin wrinkled with a look like that of a snake. No further development was observed and the foregoing represents the mature larva.

By July 4 all but one in the cage with the dirt had disappeared, while those in the battery jar were grubbing in the sand and under leaves and refuse. These had shrunk to half their length. In the course of a few days these larvæ pupated, some in slight cocoons of frass and sand and others bare upon the surface. Evidently in nature pupation takes place underground.

Pupa.—Length 23 mm.; diameter 7 mm. Length of thorax and wing cases 11 mm. Main cremaster short and thick with a round hook almost closed. Two or three much smaller auxiliaries with ends wound up like watch springs. Color dull brown in some cases inclining to mahogany. Stigmata visible with a strong glass. On the whole the pupæ looked singularly small. Larval period average 30 days.

April 26, 1917. Two moths emerged, making the pupal period 295 days, which was extended to May 14, when the last moth appeared. From some 50 or 60 well-grown healthy-looking larvæ only 14 moths were obtained, 4 males and 10 females.

None of the specimens were as large as some which had been taken on the wing. All typically marked and colored, and very uniform in their appearance.

TWO NEW VARIETIES OF *CICINDELA TRANQUEBARICA* FROM CALIFORNIA.

BY H. C. FALL, Pasadena, Cal.

I have this season received two forms of *C. tranquebarica* from the Owens Lake region of California which cannot well be included under any of the numerous varietal names already proposed, and which seem quite as worthy of names as any of the forms at present listed.

The giving of distinctive names to slight variations—color or otherwise—is a form of diversion which may be easily overdone, but which seems more defensible than usual in *Cicindela* because of its great popularity with collectors, who almost invariably segregate the readily distinguishable forms in their cabinets, for which purpose and for facility in exchanges the varietal names are a decided convenience.

C. tranquebarica var. *inyo* n. var.—Moderately brilliant green, varying through duller green to deep blue (type blue green). Markings broad and complete, nearly as heavy as in average *Kirbyi*. Beneath entirely blue green.

Olancha, California. April and May. Collector, G. R. Pilate.

C. tranquebarica var. *owena* n. var.—Same as the preceding except in color, which is black, the elytra with faint deep greenish reflections at sides in most examples. Markings similarly heavy and complete; body beneath blue green as before.

Olancha, California. Late May and June. (G. R. Pilate.)

These two forms are evidently seasonal, at least to a certain extent. Mr. Pilate writes me that only green and blue examples were seen in the early part of the season, while by June 1st these had entirely disappeared and the black form alone was present.

Inyo is evidently closest to the form *viridissima*, but the latter is typically of a more vivid green, always with narrower markings, the humeral lunule frequently interrupted.